

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

| | | | |
|---|--|---|----------------------|
| Applicant's or agent's file reference 904096 | FOR FURTHER ACTION | | See Form PCT/PEA/416 |
| International application No. PCT/JP2004/010249 | International filing date (day/month/year) 12.07.2004 | Priority date (day/month/year) 31.07.2003 | |
| International Patent Classification (IPC) or national classification and IPC H02M7/48 | | | |
| Applicant TOYOTA JIDOSHA KABUSHIKI KAISHA et al. | | | |
| <p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau) a total of 2 sheets, as follows:</p> <p><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in Item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p> | | | |
| <p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</p> | | | |
| Date of submission of the demand 29.12.2004 | | Date of completion of this report 31.10.2005 | |
| Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465 | | Authorized Officer Roeder, A Telephone No. +49 89 2399-2330  | |

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/JP2004/010249

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language, which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages

1-19 as originally filed

Claims, Numbers

1-5 received on 13.10.2005 with letter of 13.10.2005

Drawings, Sheets

1/8-8/8 as originally filed

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/JP2004/010249

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | |
|-------------------------------|-------------|-----|
| Novelty (N) | Yes: Claims | 1-5 |
| | No: Claims | |
| Inventive step (IS) | Yes: Claims | 1-5 |
| | No: Claims | |
| Industrial applicability (IA) | Yes: Claims | 1-5 |
| | No: Claims | |

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VIII Certain observations on the International application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

The Japanese patent JP 2000 333 465 is regarded as being the closest prior art to the subject-matter of claim 5 and shows (the references in parentheses applying to this document): a load driver comprising an inverter (3) driving a load (6); a voltage converter (2) executing voltage conversion between a power supply (1) and said inverter (2); and a control device (10) controlling said inverter (2) to drive said load (6).

The subject-matter of claim 5 differs from this known in that the control device drives the load in one of pulse width modulation control mode and an overmodulation control mode when the voltage converter performs a boosting operation.

The subject-matter of claim 5 is therefore new (Article 33(2) PCT).

The problem to be solved by the present invention may be the occurrence of overcurrent in the inverter during rectangular-wave control mode in case the DC voltage supplied to the inverter is boosted.

The solution to this problem proposed in claim 5 is considered as involving an inventive step, Article 33(3) PCT, for the following reasons:

Whereas in the above prior art the control mode is changed from pulse width modulation control mode to rectangular-wave control mode in dependence of the converter input voltage and a required load voltage the present invention provides pulse width modulation control mode or overmodulation control mode to the inverter when the converter performs a boosting operation thus avoiding the kind of control mode used in the closest prior art during boosting operation of the converter. Moreover, the closest prior art document does not disclose a relation between the control mode of the inverter and the voltage boosting operation mode of the converter.

Claims 2 and 3 are dependent on claims 1 and 4 and as such also meet the requirements

of the PCT with respect to novelty and inventive step.

Re Item V Observations on the clarity of the claims

Claims 1 and 4 each comprise all the features of claim 5 and are therefore not appropriately formulated as a claim dependent on the latter (Rule 6.4 PCT) containing only those features which go beyond the subject-matter of claim 5. This means that claim 5 should have been made the only independent claim, i.e. a new claim 1 and present claims 1 and 4 should have been turned into claims that depend on this new claim 1.

In consequence thereto the description should have been brought into conformity with the amended claims, Article 6 PCT.